

Review of *Xenoecheira* Haswell, 1879 (Crustacea: Amphipoda: Aoridae)

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ABSTRACT. *Xenoecheira fasciata* Haswell, 1879 is redescribed from the female type material collected from Port Jackson, New South Wales, Australia. An additional male and female specimen from recent collections made in New South Wales are also illustrated. New records of *Xenoecheira pirloti* Moore, 1988 from tropical northern Australia are provided which include a growth series of male and female specimens. This development range indicates that the type specimens from Aru Islands in east Indonesia are immature individuals. The new species *X. xandrothrix* is described from a single male specimen collected in the Beagle Gulf, Northern Territory, Australia. An updated generic diagnosis for *Xenoecheira* Haswell, 1879 is provided, along with a key to the five known species.

KEYWORDS. Crustacea; Amphipoda; Aoridae; *Xenoecheira*; taxonomy; new species

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Introduction

Xenoecheira Haswell, 1879 are filter-feeding aorids recorded in shallow-water benthic samples from tropical to temperate waters (Moore, 1988). *Xenoecheira* have a basket of long setae on gnathopod 2 in male and females, which is similar in appearance, although analogous, to other filter-feeding groups including *Autonoe* Bruzelius, 1859; *Grandidierella* Coutiere, 1904; *Haplocheira* Haswell, 1879; *Lemboides* Stebbing, 1895; *Microdeutopus* Costa, 1853 and *Leptocheirus* Zaddach, 1844 (see Moore, 1988; Myers, 2009). The diagnosis of *Xenoecheira* has lagged behind other well defined aorid genera due to the limited knowledge of the type species *X. fasciata* Haswell, 1879 (Moore, 1988; Lyons & Myers, 1990).

Currently three species are placed in *Xenoecheira*: *X. fasciata* Haswell, 1879 from southern Australia, *X. longisetosa* Ren, 2006 from the South China Sea and *X. pirloti* Moore, 1988 from the Aru Islands in east Indonesia.

This study recognizes the new species *X. xandrothrix* collected from the Beagle Gulf in Northern Territory, Australia and expands the known distribution of *X. fasciata* and *X. pirloti* in Australian waters. The numerous specimens of *X. pirloti* from a single sample has allowed a detailed analysis of the growth stage variation and development of the male gnathopod 2 is documented with increasing body size. An updated diagnosis of the genus *Xenoecheira* is provided to stabilize the generic name and more clearly define the genus from other closely related groups. A key to males of *Xenoecheira* species is provided.

Material and methods

Specimens examined for this study are lodged with the Australian Museum (AM), Museums Victoria (NMV), South Australian Museum (SAMA), the Museum and Art Gallery of the Northern Territory (NTM) and the Western Australian Museum (WAM). Slides were made using Aquatex™ mounting agent. Illustrations were made using a Leitz Laborlux K fitted with Nomarski lens and camera lucida. Plates were assembled using Photoshop CS6. Underlined text indicates diagnostic characters. Abbreviations for parts are as follows: *G*, gnathopod; *LL*, lower lip; *Md*, mandible; *Mx*, maxilla; *Mxp*, maxilliped; *P*, pereopod; *p*, palp; *T*, telson; *U*, uropod; *UL*, upper lip. Comparative material: *Autonoe seurati* (Chevreux, 1907), AM P.75672–P.75676, Torres Strait, Queensland.

Systematics

Aoridae Stebbing, 1899

Xenocheira Haswell, 1879

Xenocheira Haswell, 1879: 272. —Haswell, 1885: 105. —Stebbing, 1906: 624. —Moore, 1988: 706. —Myers, 1988: 191. —Barnard & Karaman, 1991: 240–241, figs 45E, 46E. —Lowry & Stoddart, 2003: 73 (catalogue).

Generic diagnosis. Sternal processes absent. Mandibular molar trititative, palp article 3 longer than 2, posterodistal margin straight, with setae of several lengths. Maxilliped basal endite anterior margin without wing-like flanges. Gnathopod 1 merus short; carpus shorter than propodus. Male gnathopod 1 propodus enlarged. Female gnathopod 1 simple to weakly subchelate. Male and female gnathopod 2 carpus anterior margin with flange, with line of long slender setae. Pereopods 3–4 merus and carpus distal margins without long slender setae. Pereopods 5–7 basis posterior margin lined with dense plumose setae. Uropods

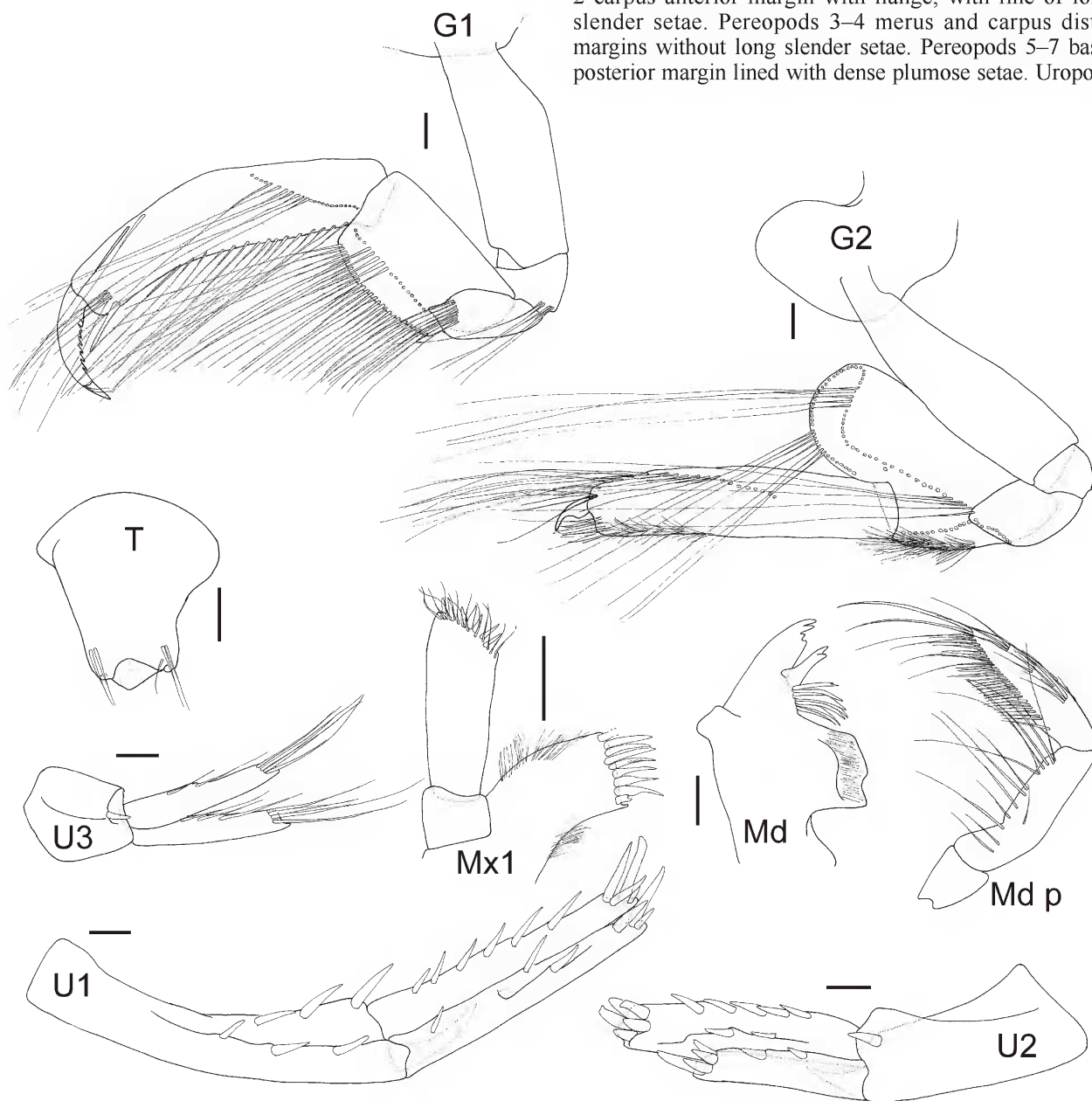


Figure 1. *Xenocheira fasciata* Haswell, 1879, female lectotype, AM P.25466, Port Jackson, New South Wales (scale 0.1 mm).

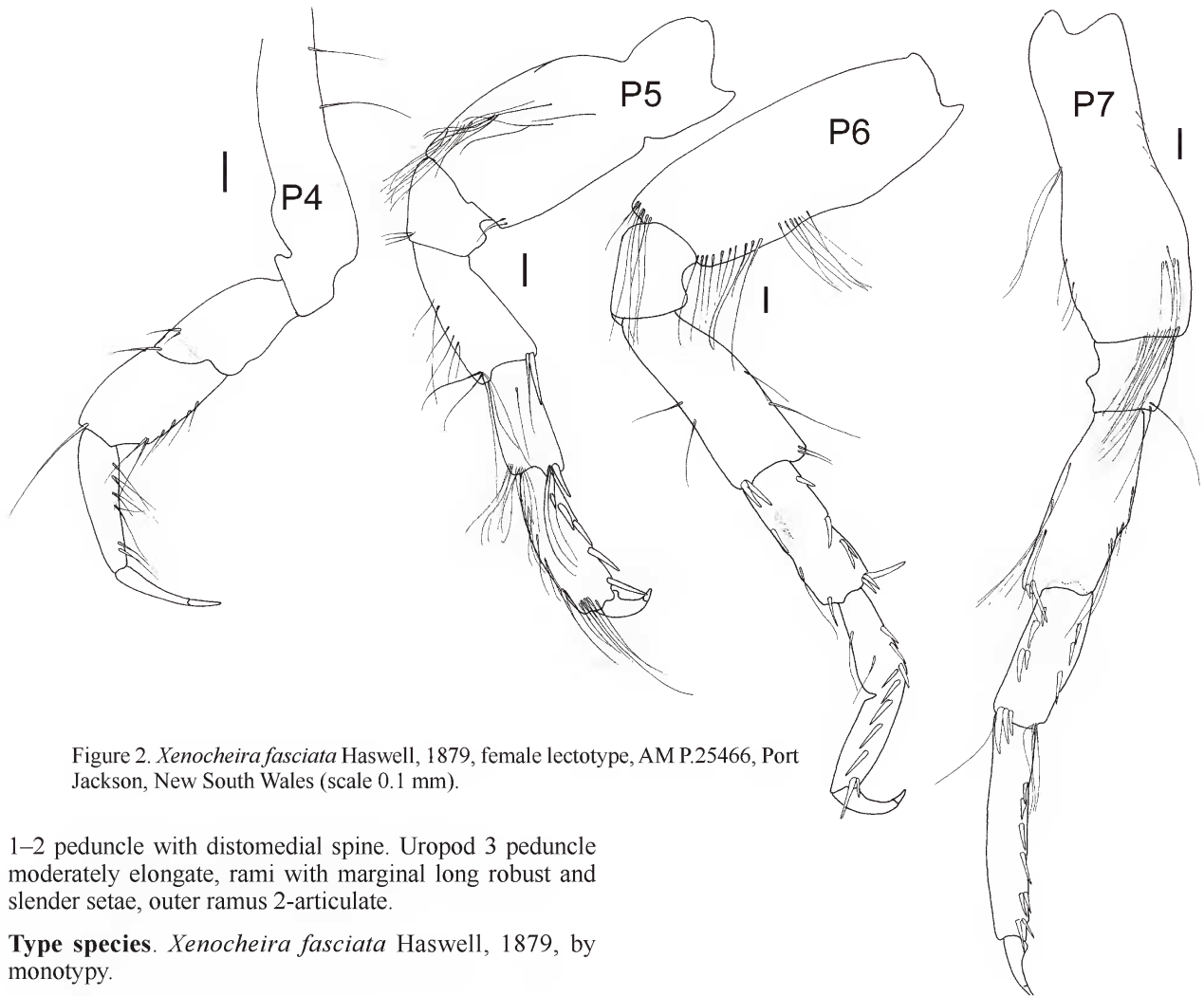


Figure 2. *Xenocheira fasciata* Haswell, 1879, female lectotype, AM P.25466, Port Jackson, New South Wales (scale 0.1 mm).

1–2 peduncle with distomedial spine. Uropod 3 peduncle moderately elongate, rami with marginal long robust and slender setae, outer ramus 2-articulate.

Type species. *Xenocheira fasciata* Haswell, 1879, by monotypy.

Included species. *Xenocheira fasciata* Haswell, 1879; *X. longisetosa* Ren, 2006; *X. pirloti* Moore, 1988 and *X. xandrothrix* sp. nov.

Remarks. Haswell’s original description of *Xenocheira* was of a female specimen only, collected in Port Jackson, New South Wales. Moore (1988) was the first to describe a male specimen of *Xenocheira* using material collected from Tasmania. This important contribution established that *Xenocheira* males are sexually dimorphic.

Xenocheira is close to *Bemlos* Shoemaker, 1925 and *Autonoe*, which are all sexually dimorphic genera where the propodus of gnathopod 1 is larger in males. *Xenocheira* and *Bemlos* can be separated from *Autonoe* by the carpus

of gnathopod 1 being shorter than the propodus in males. *Xenocheira* differs from *Bemlos* in the presence of an anterior carpal flange lined with setae on gnathopod 2 in both males and females.

Xenocheira spp. are similar to *Autonoe seurati* Chevreux, 1907 which also has a flange and setae, with *A. seurati* being the only *Autonoe* species with this character state. *Xenocheira* can be separated from all *Autonoe* species by the mandibular palp article 3 straight posterodistal margin (versus concave); the gnathopod 1 carpus which is shorter than the propodus (versus subequal) and the uropod 3 rami with long robust and slender setae (versus robust setae only).

Key to males of *Xenocheira* Haswell, 1879 species

- 1

Gnathopod 1 propodus palm weakly obtuse

2
- Gnathopod 1 propodus palm transverse to subacute

3
- 2

Gnathopod 1 dactylus posterior margin smooth

X. fasciata Haswell, 1879
- Gnathopod 1 dactylus posterior margin with proximal hump

X. xandrothrix sp. nov.
- 3

Gnathopods 1 and 2 basis anterior margin without rows of slender setae

X. pirloti Moore, 1988.
- Gnathopods 1 and 2 basis anterior margin with rows of slender setae

X. longisetosa Ren, 2006

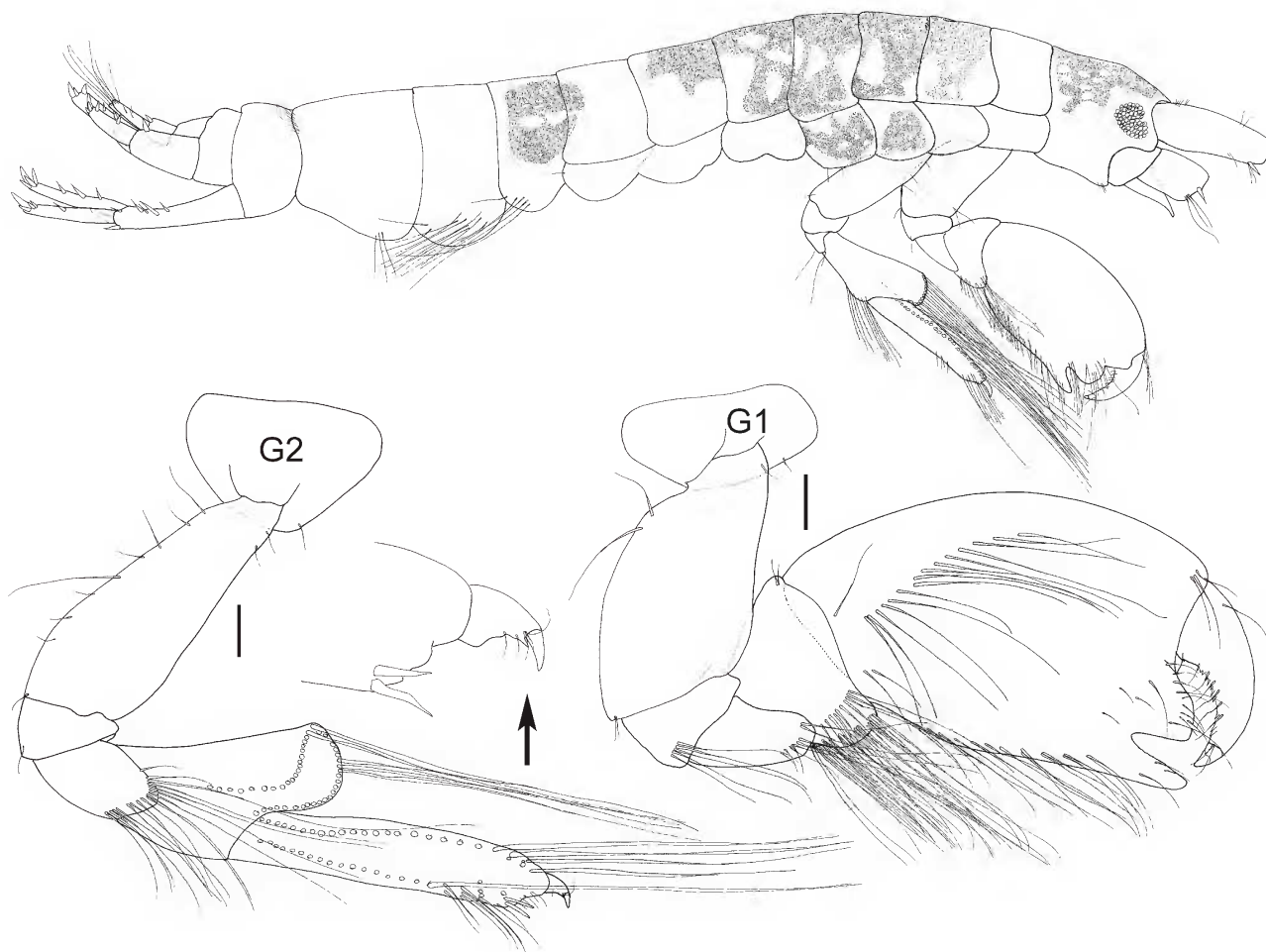


Figure 3. *Xenoechira fasciata* Haswell, 1879, male, 4.9 mm, AM P.99086, east of Red Head, New South Wales (scale 0.1 mm).

Xenoechira fasciata Haswell, 1879

Figs 1–6

Xenoechira fasciata Haswell, 1879: 272, pl. XI, fig. 6a–c. — Haswell, 1885: 105, pl. XVI, figs 1–3. — Stebbing, 1906: 624. — Moore, 1988: 706, figs 1–3 (invalid designation of holotype status). — Barnard & Karaman, 1991: 240–241, figs 45E, 46E. — Springthorpe & Lowry, 1994: 16 (catalogue). — Lowry & Stoddart, 2003: 73 (catalogue). not *Xenoechira fasciata*. — K. H. Barnard, 1931: 125, fig. 4a, b. (accepted as *Grandidierella gilesi* Chilton, 1921 see Moore, 1988). — Pirlot, 1938: 335, fig. 150 (accepted as *X. pirloti* Moore, 1988).

Type locality. Port Jackson, New South Wales, Australia, 33°51'S 151°16'E.

Material examined. **Lectotype**, female, AM P.25466, 4 slides, carcass in parts on slides, length unknown, Port Jackson, New South Wales, Australia, 33°51'S 151°16'E, Australian Museum old collection (pre-1905), no further details. **Possible syntype**, female (poor condition, some parts of gnathopods and uropods missing), AM P.99078, Port Jackson, New South Wales, Australia, 33°51'S 151°16'E, Keith Sheard Collection (label Cotype. One Co-type mounted. KS).

New South Wales: male, 4.9 mm, dissected, 2 slides, AM P.99086, east of Red Head, 32°03'17"S 152°33'14"E, 12.4 m, orange lacy bryozoan (*Triphyllozoon?* sp.) from low profile rocky reef with sand gutters, 22 March 2003, coll. AM party (NSW 2245); b female, 5.8 mm, 4 slides, AM P.99087,

east of Red Head, 32°03'17"S 152°33'14"E, 12.4 m, orange lacy bryozoan (*Triphyllozoon?* sp.) from low profile rocky reef with sand gutters, 22 March 2003, coll. AM party (NSW 2245); 2 female specimens, AM P.73749, east of Red Head, 32°03'17"S 152°33'14"E, 22 March 2003, coll. AM party (NSW 2263); 2 specimens, AM P.77259, east of Red Head, 32°03'17"S 152°33'14"E, 12.4 m, orange lacy bryozoan (*Triphyllozoon?* sp.) from low profile rocky reef with sand gutters, 22 March 2003, coll. AM party (NSW 2245); 4 specimens, AM P.26103, Sow and Pigs Reef, Port Jackson, 33°50'18"S 151°16'12"E, 30 September 1976, Sample 2; 3 specimens, AM P.77135, Bottle and Glass Rocks, Port Jackson, 33°50'54"S 151°16'12"E, 4 m, soft sediment, 23 April 1982, coll. J. K. Lowry and R. T. Springthorpe (NSW 102); 1 specimen, AM P.77276, south west side of Cabbage Tree Island, north east of Port Stephens, 32°41'24"S 152°13'20"E, 13.9 m, rocks, 9 March 2006, coll. R. T. Springthorpe (NSW 2889); 1 specimen, AM P.77279, south west side of Cabbage Tree Island, north east of Port Stephens, 32°41'24"S 152°13'20"E, 10.5 m, dead coral rubble, 9 March 2006, coll. K. B. Attwood (NSW 2901); 1 specimen, AM P.80522, south-west side of Boondelbah Island, east of Port Stephens, 32°42'30"S 152°13'32"E, 10 March 2006, coll. A. Murray (NSW 2909); 17 specimens, AM P.77282, south-west side of Boondelbah Island, east of Port Stephens, 32°42'30"S 152°13'32"E, 16 m, rock with coelenterate *Acabaria* sp., 10 March 2006, coll. A. Murray (NSW 2909); 9 specimens, AM P.77283, south-west side of Boondelbah Island, east of Port Stephens, 32°42'30"S 152°13'32"E, 20 m, under stones, 10 March 2006, coll. R. T. Springthorpe (NSW 2914); 4 specimens, AM P.77302, sewerage pipeline, Nelson Bay, Port Stephens, 32°43'11"S 152°08'28"E, 10 m, mass of intertwined dead algae, 15 March 2006, coll. C. Fraser (NSW 3042); 5 specimens, AM P.77303, sewerage pipeline, Nelson Bay, Port Stephens, 32°43'11"S 152°08'28"E, 8 m, sponges and rubble, 15 March 2006, coll. C. Arango (NSW 3053); many specimens, AM P.77301, sewerage pipeline, Nelson Bay Port Stephens, 32°43'11"S 152°08'28"E, 10.9 m, bottom growth, 15 March 2006, coll. K. B. Attwood (NSW 3038); 3 specimens, AM P.77295, sloping rock reef with ledges,

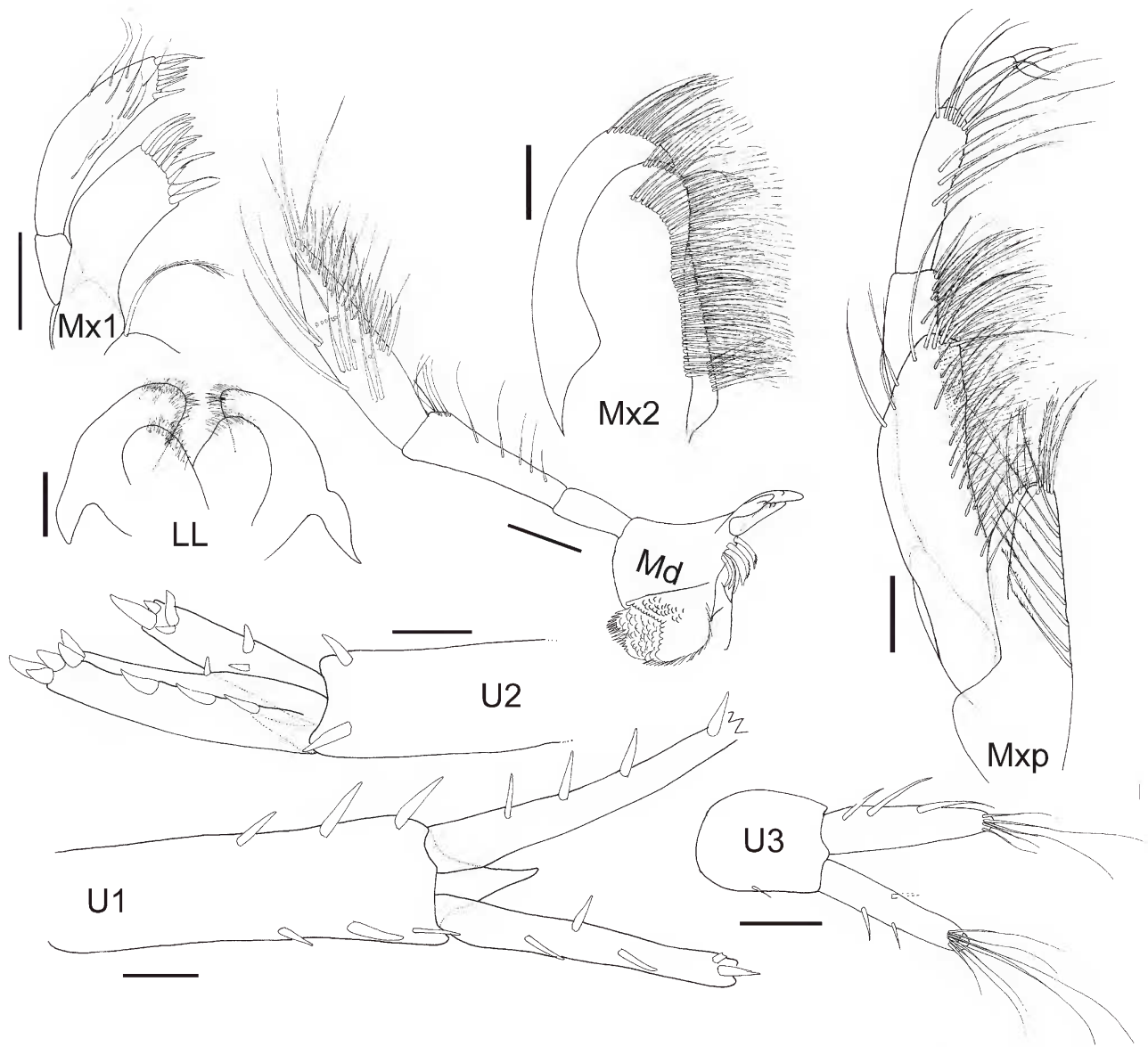


Figure 4. *Xenoecheira fasciata* Haswell, 1879, male, 4.9 mm, AM P.99086, east of Red Head, New South Wales (scale 0.1 mm).

Esmerelda Cove, Broughton Island, north east of Port Stephens, 32°37'19"S 152°19'10"E, 18–19.2 m, bushy brown algae from under kelp, 11 March 2006, coll. K. B. Attwood and C. Fraser (NSW 2954); 1 specimen, AM P.77267, Park Beach Bommie, east of Coff's Harbour, 30°17'42"S 153°12'E, 14 m, ascidian, ?*Clavellina* sp., 3 May 2005, coll. K. B. Attwood (NSW 2833); 8 specimens, AM P.77261, Chopper Rock, north-west of North West Solitary Island, 30°00'30"S 153°15'22"E, 17 m, ascidian, *Herdmania momus*, low profile reef with plate corals, rocky reef and patches of sand, 29 April 2005, coll. S. J. Keable (NSW 2778); 1 specimen, AM P.57235, 100 m north-west of Split Solitary Island, 30°14'S 153°10'48"E, 7 March 1992 (NSW 697); male, dissected, 3 slides, AM P.99090, west side of Box Head, Broken Bay, 33°33'S 151°21'E, sponge, 22 November 1982, coll. J. K. Lowry and R. T. Springthorpe (NSW 171); many specimens, AM P.99089, west side of Box Head, Broken Bay, 33°33'S 151°21'E, sponge, 22 November 1982, coll. J. K. Lowry and R. T. Springthorpe (NSW 171); male, AM P.99092, west side of Box Head, Broken Bay, 33°33'S 151°21'E, sponge *Clathria macropora* with crinoids, 22 November 1982, coll. J. K. Lowry and R. T. Springthorpe (NSW 160); 2 specimens, AM P.99093, west side of Box Head, Broken Bay, 33°33'S 151°21'E, bryozoan, 22 November 1982, coll. J. K. Lowry and R. T. Springthorpe (NSW 174); 6 specimens, AM P.99091, west side of Box Head, Broken Bay, 33°33'S 151°21'E, 15 m, bryozoan, on rocky substrate, small crinoid, *Antedon incomoda*, 22 November 1982, coll. J. K. Lowry and R. T. Springthorpe (NSW 158).

South Australia: 6 specimens (1 male and 5 females), SAMA C6407, southern Gulf St Vincent, 20–40 m, in prawn trawl, May/June 1987, coll. S. Corigliano, FV *Rivoli Queen*; many specimens, SAMA C6408, west of Aldinga, 33°16'00"S 138°27'00"E, in prawn trawl, 38–41 m, 4–5 May 1987, RV *Rivoli Queen*, K. L. Gowlett-Homes and S. Corigliano; 5 specimens (1 male and 4 females), SAMA C6410, 18.6 miles west northwest of Rapid Head, Gulf St Vincent, 35°31'08"S 138°10'01"E, sponges and bryozoans, in prawn trawl, 23 June 1987, coll. K. L. Gowlett-Homes and S. Corigliano, FV *Rivoli Queen*; many specimens, SAMA C6409, Beacon, Curlew Point, Upper Spencer Gulf, 32°32'21"S 137°46'09"E, 27–30 m, Smith McIntyre grab, 14 January 1988, coll. V. Sergeev and E. Oks.

Victoria: 5 specimens, NMV J66436, Crib Point, 38°21'S 145°14'E, 12 m, 4 March 1997, coll. Marine and Freshwater Research Institute (MAFRI), Victoria; 2 specimens, NMV J66982, Crib Point, 38°21'S 145°14'E 15 m, 4 March 1997, coll. Marine and Freshwater Research Institute (MAFRI), Victoria; 1 specimen, NMV J66558, Long Island, Hastings, Western Port 38°19'S 145°18'E 17 m, 4 March 1997, coll. Marine and Freshwater Research Institute (MAFRI), Victoria; 2 specimens, NMV J67096, Long Island, Hastings, Western Port 38°19'S 145°14'E, 17 m, 4 March 1997, coll. Marine and Freshwater Research Institute (MAFRI), Victoria; 3 specimens, NMV J67228, Steel Wharf, Hastings, Western Port 38°18'S 145°11'E, 12 m, 5 March 1997, coll. Marine and Freshwater Research Institute (MAFRI),

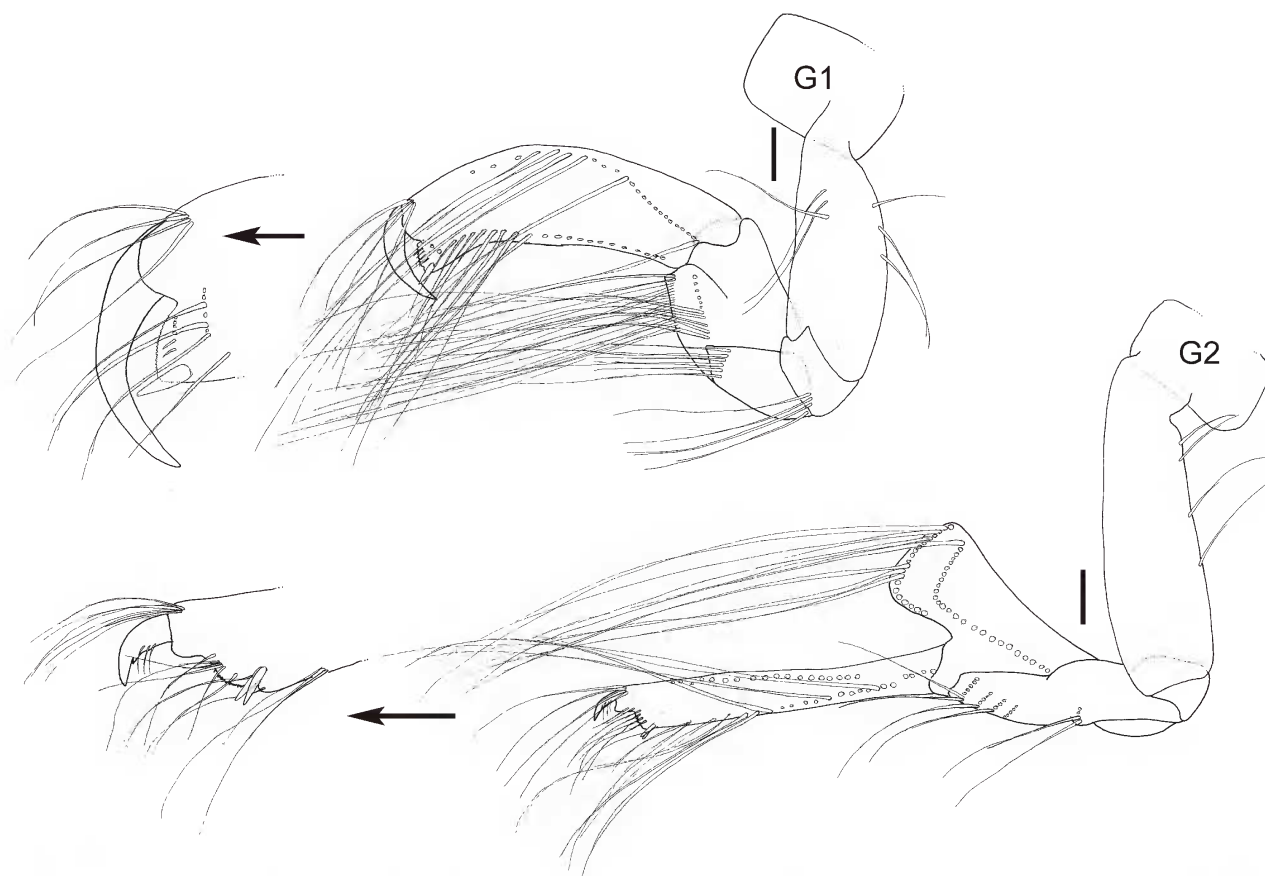


Figure 5. *Xenocheira fasciata* Haswell, 1879, female, 5.8 mm, AM P.99087, east of Red Head, New South Wales (scale 0.1 mm).

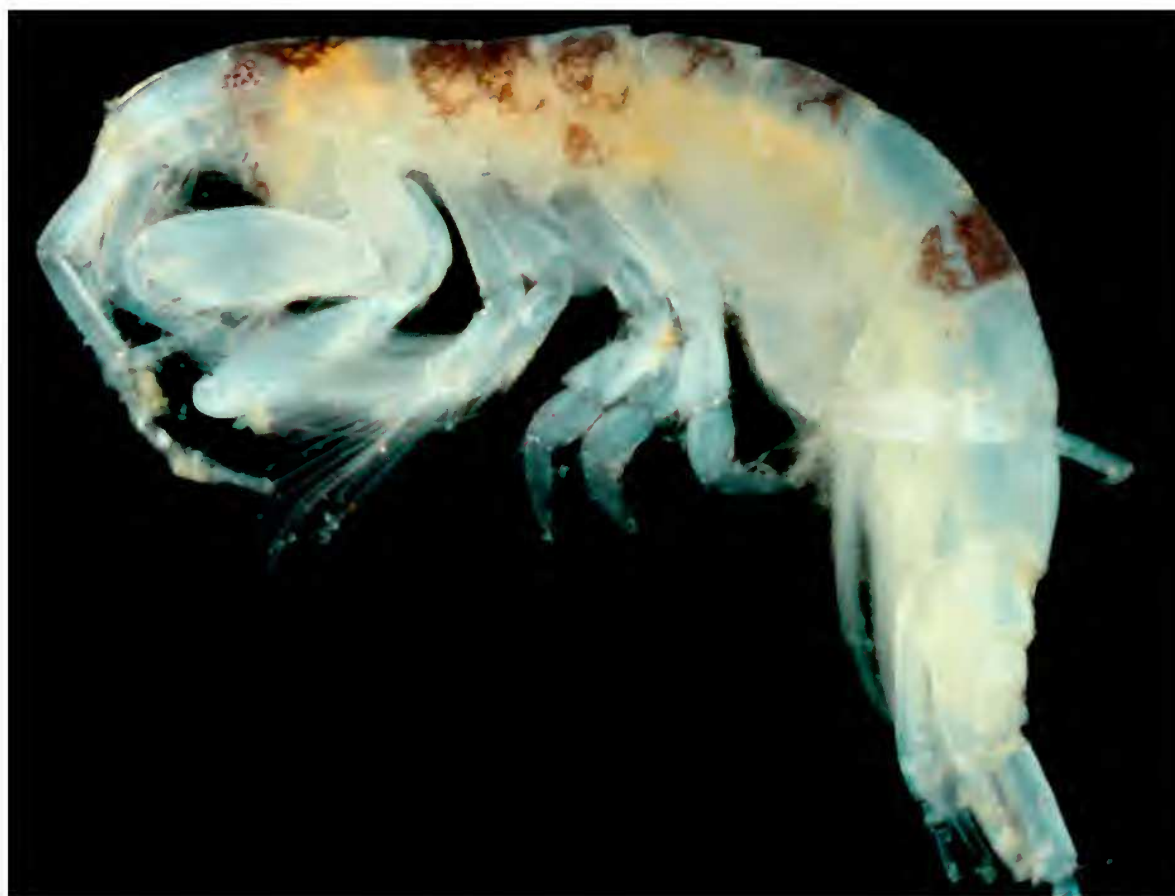


Figure 6. *Xenocheira fasciata* Haswell, 1879, male, 5.9 mm, AM P.80522, south-west side of Boondelbah Island, east of Port Stephens, New South Wales. Image by Roger Springthorpe.

Victoria; 5 specimens, NMV J67251, Steel Wharf, Hastings, Western Port, 38°17'S 145°14'E, 10 m, 5 March 1997, coll. Marine and Freshwater Research Institute (MAFRI), Victoria.

Northern Territory: 1 male and 1 female, AM P.99094, Van Diemen Rise, eastern Joseph Bonaparte Gulf, Timor Sea, 11°38'10"S 129°49'06"E, 27 m, Smith-McIntyre Grab, 12 September 2009, coll. Geoscience Australia (SOL 4934, 31GR49); 5 specimens (1 male and 4 females), NTM Cr015900, Dawson Rock, Bynoe Harbour, 12°42'17.38"S 130°35'33.42"E, 12 m, sponge sample, 9 June 2003, coll. B. Glasby *et al.*

Description. Based on female lectotype, AM P.25466.

Head. Lateral cephalic lobes apically blunt, anteroventral margin shallowly excavate to moderately recessed, anterodistal corner weakly produced. *Antenna 1* peduncle article 1 posterior margin with robust seta; flagellum unknown. *Antenna 2* unknown. *Mandible* molar tritritative; accessory setal row with 6–7 setae; palp article 3 subequal 2, length $2.1\times$ width, anterior margin straight with setae of two lengths. *Maxilla 1* inner plate with 1 apical plumose seta; palp 2-articulate, article 2 broad (turned in illustration), distal end with slender setae and 6 apical robust setae.

Pereon. *Pereonites 1–2* each without sternal process. *Gnathopod 1* female simple; basis slender, length $3\times$ breadth, anterodistal margin subquadrate; ischium posterior margin with slender setae; merus $1.8\times$ as long as broad, posterior margin with slender setae; carpus rectilinear, length $0.5\times$ propodus, posterior and midmedial margin with line of long slender setae; propodus length $4\times$ breadth, proximal end with line of long slender setae, posterior margin straight with line of long slender setae, palm weakly developed, defined by subquadrate corner with long robust seta; dactylus $0.3\times$ propodus length, recurved, posterior margin serrate, unguis present. *Gnathopod 2* subchelate; basis anterior margin straight; merus $1.6\times$ as long as broad, posterodistal margin with line of long slender setae; carpus $0.4\times$ propodus length, anterior margin with large flange, anterodistal end with double row of long slender setae, posterior margin with dense cluster of short slender setae; propodus rectilinear, length $4\times$ breadth, anterodistal end with line of long slender setae, posterodistal end with dense cluster of short slender setae, palm transverse, less than one fifth the length of posterior margin, without robust defining seta, dactylus short, recurved, reaching end of palm. *Pereopods 5–7* (P5 based on male AM P.99086) basis margins with plumose setae; ischium and merus slender with patches of slender setae; carpus anterior and posterior margin with short robust setae; propodus posterior margin lined with short robust setae; dactylus recurved, unguis present.

Pleon. *Epimera 1–2* (based on male AM P.99086) posterodistal corner rounded to subquadrate, ventral margin with plumose setae. *Epimeron 3* (based on male AM P.99086) posterodistal margin rounded. *Uropod 1* biramous; peduncle much longer than broad, distoventral interramal spine shorter than peduncle; rami subequal. *Uropod 2* biramous; peduncle subequal to inner ramus length, with distoventral interramal spine less than half length of peduncle; inner ramus longer than outer ramus, apical robust setae short. *Uropod 3* biramous, peduncle short, $0.6\times$ rami length; rami subequal, with slender marginal and apical setae. *Telson* longer than broad, apically excavate with distal slender setae.

Male (sexually dimorphic characters). Based on AM P.99086.

Gnathopod 1 male coxa not produced anterodistally; basis broad, length $1.6\times$ breadth; carpus compressed, length $0.8\times$ breadth, $0.25\times$ propodus length, posterior margin with dense long slender setae; propodus expanded, subovate, length $1.5\times$ breadth, medial surface with line of long slender setae, posterior margin with long slender setae, palm weakly obtuse, proximal shelf long, subquadrate, margin undulating, with excavate v-shaped sinus, defined by subquadrate corner with strong posterodistal spine, without post palmar robust seta; dactylus not reaching end of palm, posterior margin convex.

Remarks. Haswell's original published description of *Xenocheira* did not include specific nomination of type material, but it is significant that only a female specimen was described. Australian Museum collections of *Xenocheira fasciata* thought to be from W. A. Haswell collections include four slides which contain the partial dissection and disjointed carcass of a female. These slides are labelled "types" and "Macleay Museum", the institute where Haswell had been based. This material has been considered as a probable syntype, AM P.25466 (Springthorpe & Lowry, 1994; Lowry & Stoddart, 2003). Moore (1988) mistakenly cited AM P.25466 as a holotype.

Additionally a female specimen among the Australian Museum Keith Sheard Collection labelled "Co-type. One Co-type mounted. KS" with a second label "*Xenocheira fasciata* Hasw. Port Jackson" was recently discovered (June, 2016). This material is a possible syntype of the set of slides associated with AM P.25466. A lectotype of the more complete female specimen is herein designated to stabilize the species name.

This study extends the known distribution of *X. fasciata* to locations in both southern temperate Australian and tropical northern Australia. Material from Bynoe Harbour indicated that *X. fasciata* is sympatric with *X. pirloti*.

The lobate carpus of gnathopod 2 and long slender seta on the carpus and propodus is seen in *X. fasciata*, *X. pirloti* and another aorid, *Autonoe seurati* (Chevreux, 1907), which is also reported from tropical northern Australia (Myers, 2009). The absence of long slender setae on the basis of gnathopods 1 and 2 separates *X. fasciata* and *X. pirloti* from *A. seurati*.

Distribution. Australia. New South Wales: Coffs Harbour (current study); Port Stephens (Haswell, 1879; Moore, 1988; current study); Port Jackson (Haswell, 1879; current study); Broken Bay (current study); Twofold Bay (Hutchings, *et al.*, 1989). Victoria: Western Port; Corner Inlet; Crib Point, Hastings (Moore, 1988; current study). South Australia: Gulf St Vincent; Upper Spencer Gulf; west of Aldinga (current study). Tasmania: south-western Bass Strait; Variety Bay, Bruny Island, Freycinet Peninsula (Moore, 1988; current study). Northern Territory: Northwest Shelf; Bynoe Harbour (current study).

Xenocheira longisetosa Ren, 2006

Xenocheira longisetosa Ren, 2006: 412–414, fig. 177.

Type locality. Linchang Reef, Hainan Province, South China Sea.

Distribution. Known only from type locality.

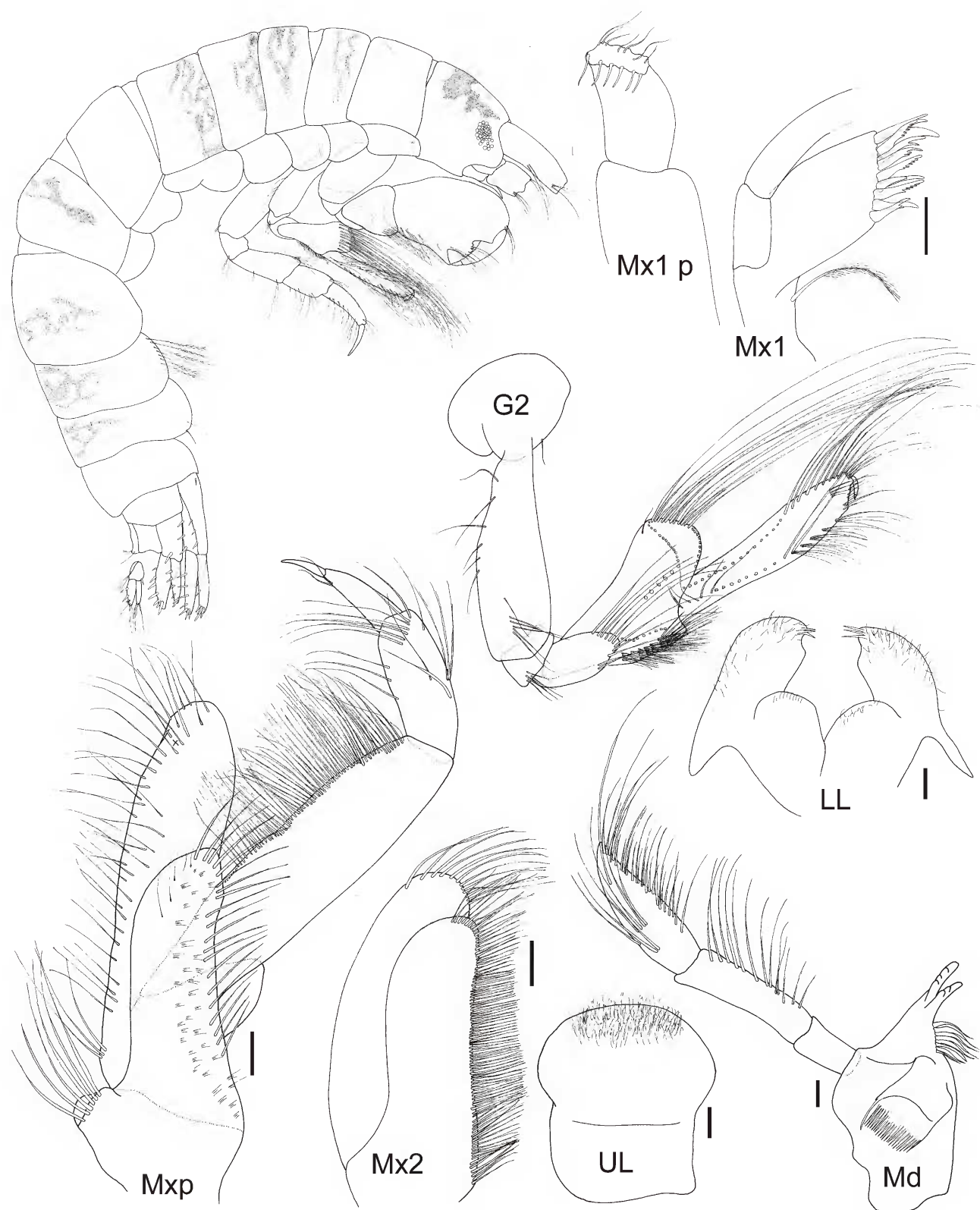


Figure 7. *Xenocheira pirloti* Moore, 1988, male, 9 mm, NTM Cr018976, Dawson Rock, Bynoe Harbour, Northern Territory (scale 0.1 mm).

Xenoecheira pirloti Moore, 1988

Figs 7–10

Xenoecheira fasciata. —Pirlot, 1938: 335, fig. 150.*Xenoecheira pirloti* Moore, 1988: 718.

Type material. Stat. 273, Pulu Jedan, Aru Islands [Iles Aru], 23–26 December 1899, shell sand [sable coquillier], 13 m, 3 males. (Material not found, pers. comm. K. Van Dorp January 2016)

Material examined. *Northern Territory*, Australia: 1 a male, 7 mm, dissected, 1 slide, NTM Cr018973; 1 b male, 7.1 mm, dissected, 1 slide, NTM Cr018974; 1 c male, 8 mm, dissected, 1 slide, NTM Cr018975; 1 d male, 9 mm, dissected, 1 slide, NTM Cr018976; 1 e female, 9.2 mm, dissected, 1 slide, NTM Cr018977; 1 f female, 5.4 mm, dissected, 1 slide, NTM Cr018978; 1 g female, 5 mm, dissected, 1 slide, NTM Cr018979; 12 specimens (4 male and 6 females), NTM Cr015901, Dawson Rock, Bynoe Harbour, 12°42'17.38"S 130°35'33.42"E, 12 m, sponge sample, 9 June 2003, coll. B. Glasby *et al.*; 1 male and 4 females, NTM Cr015886, Table Head, Port Essington, 11°13'30"S 132°10'30"E, algae and reef rock, 14 May 1983; 3 male and 2 female specimens, NTM Cr011679, north of Oliver Reef, Vernon Islands, Beagle Gulf, 12°1.02'S 130°58.86'E, 30 m, rocky bottom, 11 October 1993, coll. K. E. Coombes, FV *Kunmunyah* (Beagle Gulf Marine Park Survey).

Western Australia: 1 male, 12 mm, and 1 female, 13.2 mm, WAM C27165, Dampier Archipelago, 20°41'S 116°33'E, 23 July 1999, coll. S. Slack-Smith (DA2/99/68).

Variation. With increasing size, the male gnathopod 1 propodus becomes less elongate and more bulbous, as the posterior margin reduces and the anterior margin becomes more convex (Fig. 8).

Remarks. Pirlot (1936) identified 3 specimens from the Aru Islands as *Xenoecheira fasciata* Haswell, 1879. Based on Pirlot's illustrations of gnathopods 1 and 2, Moore (1988) considered the variation in gnathopod 1 propodus length significantly different from *X. fasciata* and established the new species name *X. pirloti* for the Aru Islands material without examining Pirlot's original specimens. Pirlot's material from the Siboga Expedition is currently held by the Department Invertebrates, Naturalis Biodiversity Center, Leiden, The Netherlands. Recent contact with the curator for Crustacea, Chelicerata and Myriapoda Karen Van Dorp confirmed that the type material (either slide or wet preparations) of *X. pirloti* could not be located and for now is considered presumed lost.

Assessment of a large set of tropical Australia collections of *Xenoecheira pirloti* included large adult males, gravid females and a range of smaller specimens has revealed the Aru Islands material are juvenile specimens of indeterminate sex and not adult males. A growth series of material is presented here to demonstrate the full development range of *X. pirloti*. This present description of additional material of *X. pirloti* supports this species as distinct from *X. fasciata*. *Xenoecheira pirloti* is known from tropical waters in northern Australia and the Banda Sea in the Indonesian Archipelago while *X. fasciata* occurs in temperate waters along east coast and southern Australia including Tasmania.

Xenoecheira pirloti is most similar to *X. fasciata* in the male gnathopod 1 propodus palm with sinus. *Xenoecheira pirloti* has an acute gnathopod 1 propodus palm while *X. fasciata* has an obtuse palm. See also remarks for *X. fasciata*.

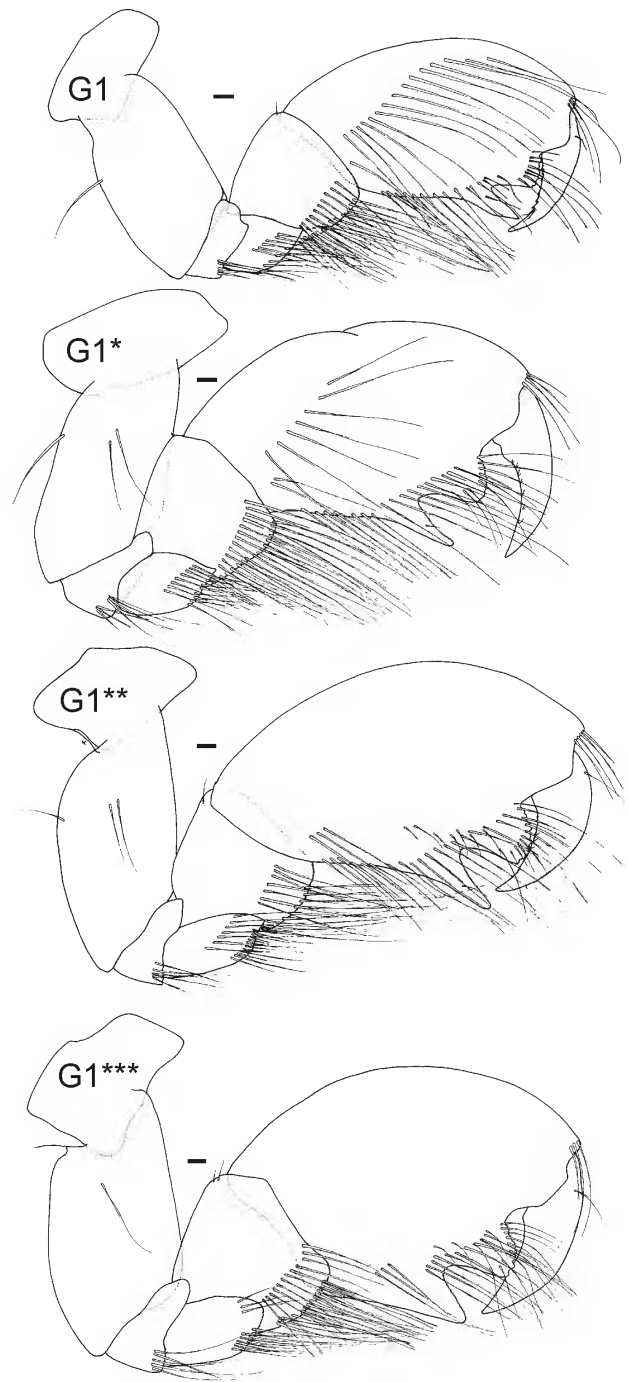


Figure 8. *Xenoecheira pirloti* Moore, 1988, male, 7.0 mm, NTM Cr018973, male*, 7.1 mm, NTM Cr018974, male**, 8 mm, NTM Cr018975, male***, 9 mm, NTM Cr018976, Dawson Rock, Bynoe Harbour, Northern Territory (scale 0.1 mm).

Distribution. Indonesia: Pulu Jedan, Aru Islands (Pirlot, 1936). Australia. Northern Territory: Beagle Gulf, Port Essington, Bynoe Harbour, Dampier Archipelago (current study).

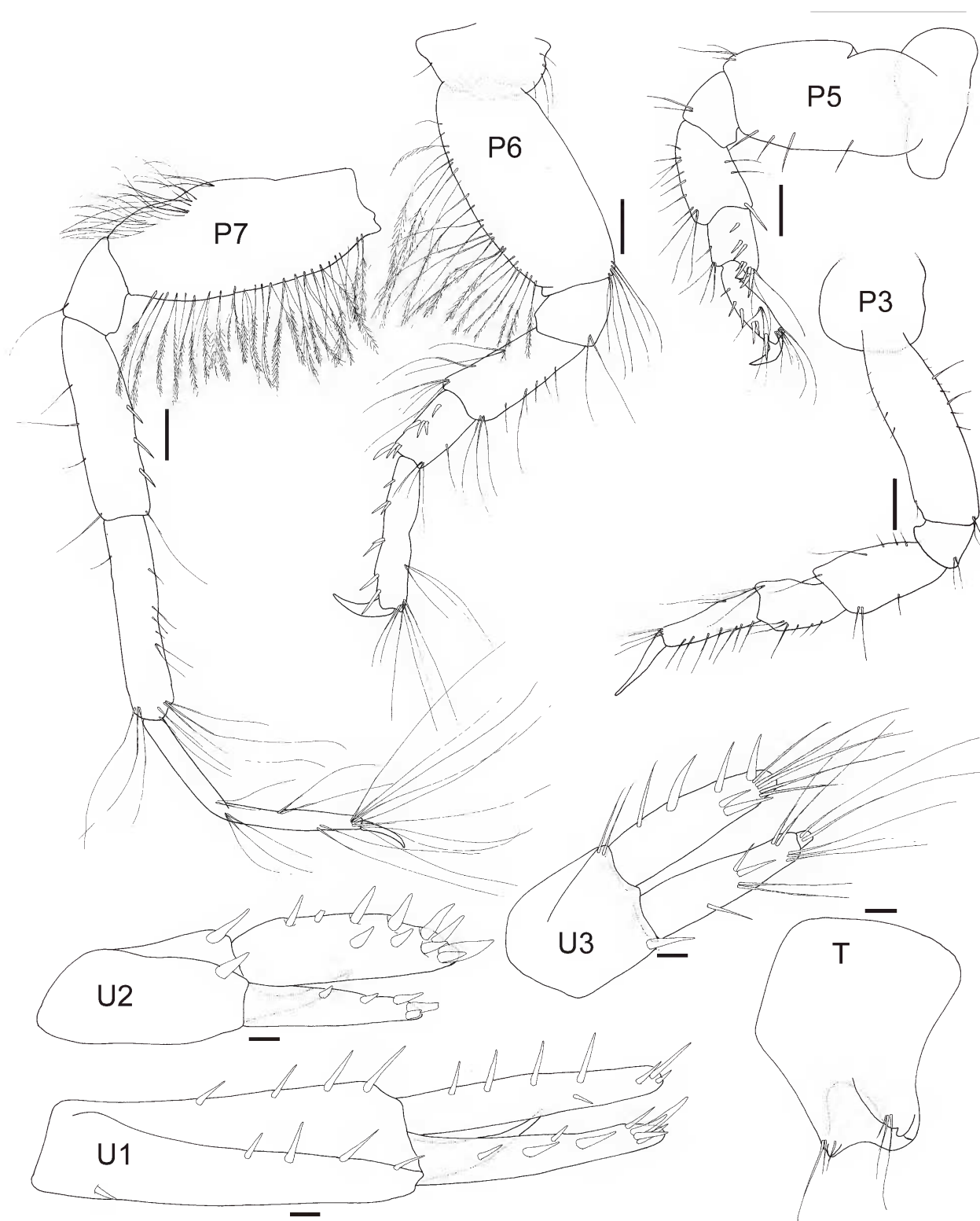


Figure 9. *Xenocheira pirloti* Moore, 1988, d male, 9 mm, NTM Cr018976, Dawson Rock, Bynoe Harbour, Northern Territory (scale 0.1 mm).

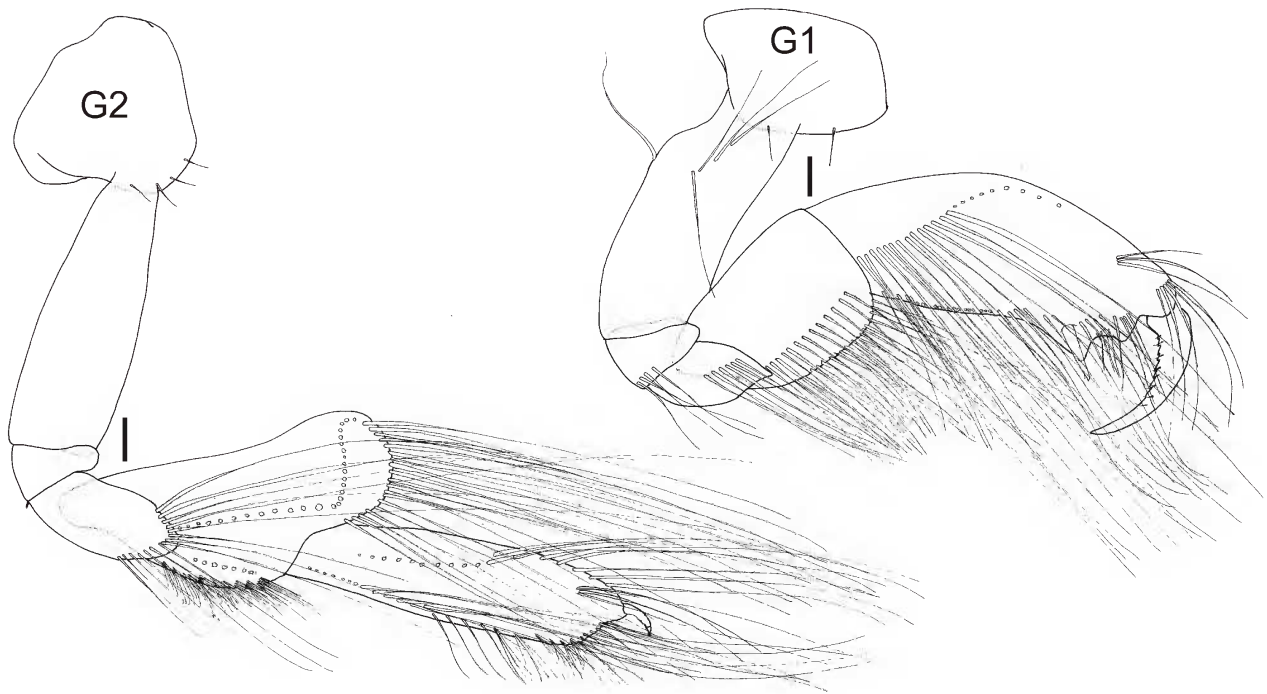


Figure 10. *Xenocheira pirloti* Moore, 1988, e female, 9.2 mm, NTM Cr018977, Dawson Rock, Bynoe Harbour, Northern Territory (scale 0.1 mm).

Xenocheira xandrothrix sp. nov.

Figs 11, 12

Holotype male, 6.4 mm, NTM Cr011636, west of Elizabeth Reef, Cape Hotham, Beagle Gulf, Northern Territory, Australia, 12°04'S 131°20'E, 21 m, shale, 9 October 1993, coll. R. S. Williams, FV *Kunmuyah* (Beagle Gulf Marine Park Survey).

Type locality. West of Elizabeth Reef, Cape Hotham, Beagle Gulf, Northern Territory, Australia.

Etymology. From the Greek, *xandros* for sea monster and the suffix *thrix* meaning hairy.

Description based on holotype male, 6.4 mm, NTM Cr011636.

Head. Lateral cephalic lobes weakly truncate, anteroventral margin shallowly excavate to moderately recessed, anterodistal corner subacute. *Antenna 1* peduncle article 1 posterior margin without robust setae; flagellum unknown. *Antenna 2* unknown. *Mandible* molar triturative; accessory setal row with 8 setae; palp article 3 longer than 2, length $3.1\times$ breadth, anterior margin straight with setae of two lengths. *Maxilla 1* inner plate with 1 apical plumose seta; palp 2-articulate, article 2 broad, distal end with slender setae and 6 apical robust setae.

Pereon. *Pereonites 1–2* without sternal process. *Gnathopod 1* male coxa not produced anterodistally; basis broad, length $1.9\times$ breadth; carpus compressed, length $0.8\times$ breadth, $0.25\times$ propodus length, posterior margin with dense long slender setae; propodus expanded, subovate, length $1.5\times$ breadth,

posterior margin with long slender setae, palm weakly obtuse, proximal shelf long, subquadrate, margin undulating, distal margin with narrow v-shaped sinus, defined by subquadrate corner with strong posterodistal spine reaching beyond dactylus, without post palmar robust seta; dactylus reaching beyond palm, posterior margin convex with proximal hump. *Gnathopod 2* subchelate; basis proximally narrow, distally broad; merus $1.3\times$ as long as broad; carpus $0.6\times$ propodus length, anterior margin with large flange, anterodistal end with double row of long slender setae, posterior margin with dense cluster of short slender setae; propodus rectilinear, length $4\times$ breadth, anterodistal end with line of long slender setae, posterodistal end with dense cluster of short slender setae, palm transverse, less than one fifth the length of posterior margin, without robust defining seta, dactylus short, recurved, reaching end of palm. *Pereopods 5–7* basis margins with plumose setae; ischium, merus and carpus with patches of slender setae; propodus anterior and posterior margin with short robust and long slender setae; dactylus recurved, unguis present.

Pleon. *Epimera 1–2* posterodistal corner rounded to subquadrate, ventral margin with plumose setae. *Epimeron 3* posterodistal margin rounded with distal notch. *Uropod 1* biramous; peduncle much longer than broad, distoventral interramal spine shorter than peduncle; rami subequal. *Uropod 2* biramous; peduncle subequal to inner ramus length, with distoventral interramal spine less than half length of peduncle; inner ramus longer than outer ramus, apical robust setae of various lengths. *Uropod 3* biramous, peduncle short, $0.6\times$ rami length; rami subequal, with slender marginal and apical setae. *Telson* longer than broad, apically excavate with distal slender setae.

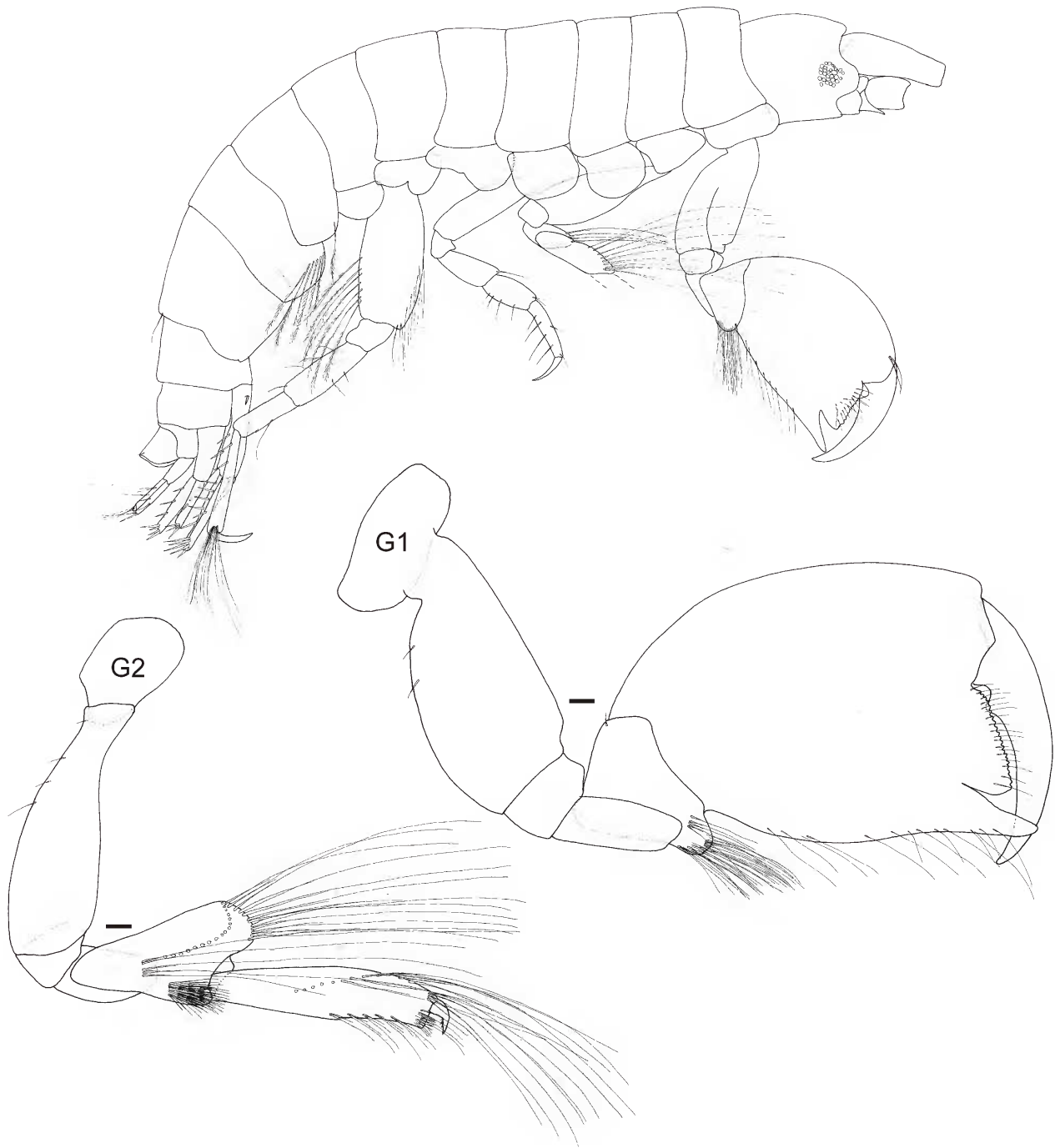


Figure 11. *Xenoecheira xandrothrix* sp. nov. holotype, 6.4 mm, NTM Cr011636, west of Elizabeth Reef, Cape Hotham, Beagle Gulf, Northern Territory (scale 0.1 mm).

Remarks. *Xenoecheira xandrothrix* sp. nov. and *X. fasciata* have the male gnathopod 1 palm obtuse, separating them from *X. longisetosa* and *X. pirloti* which have a transverse palm. *Xenoecheira xandrothrix* sp. nov. has the male gnathopod 1 propodus with the distal spine extending beyond the dactylus which separates it from all other

species in the genus. The gnathopod 1 dactylus is slender and has a proximal tooth on the posterior margin which further separates it from other *Xenoecheira* species.

Distribution. Known only from type locality.

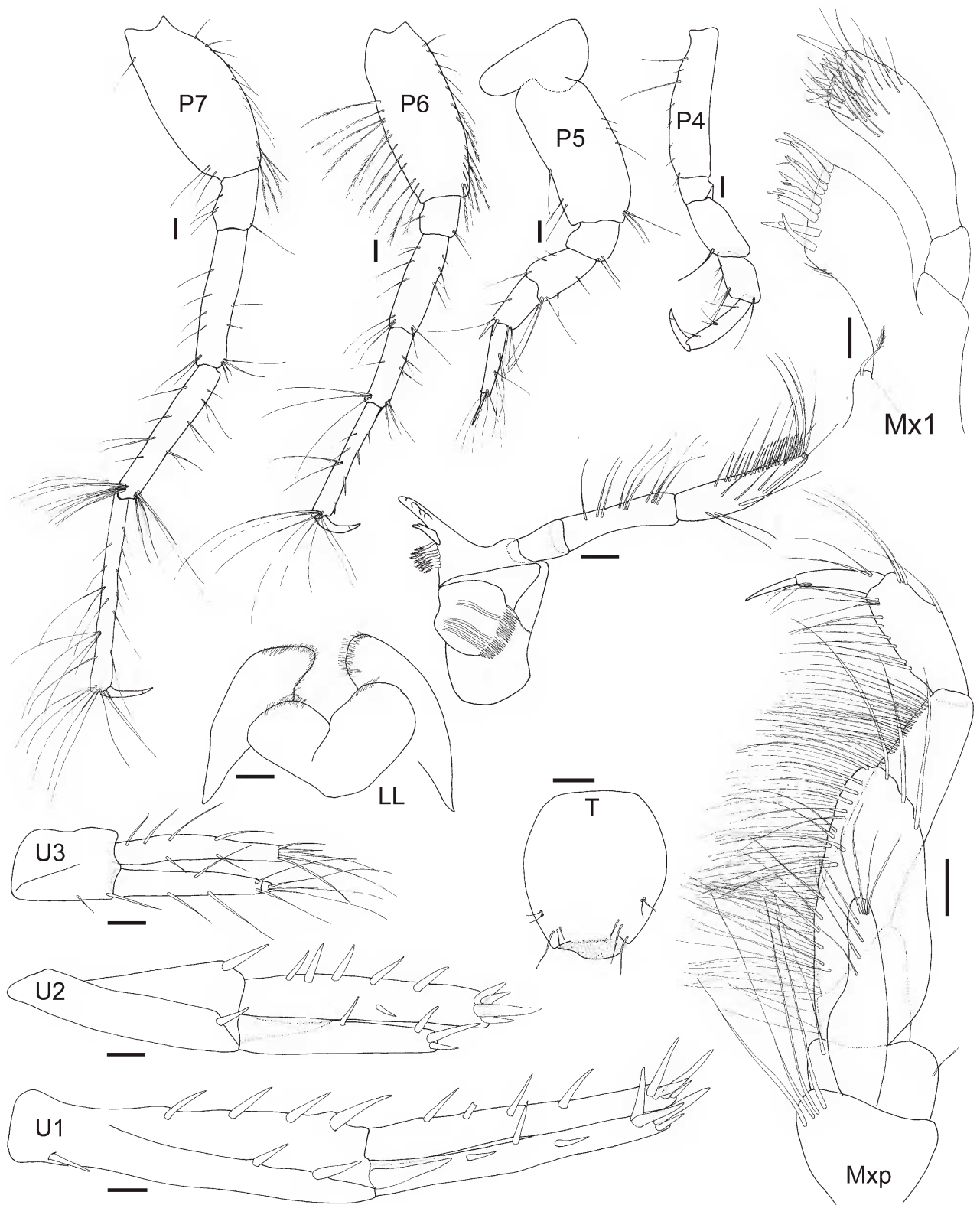


Figure 12. *Xenoecheira xandrothrix* sp. nov. holotype, 6.4 mm, NTM Cr011636, west of Elizabeth Reef, Cape Hotham, Beagle Gulf, Northern Territory (scale 0.1 mm).

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